WHAT IS CLAIMED IS:

1	1.	A method of	regulating the replication of a DNA molecule, the	
2	method comprising,			
3	introducing into a eukaryotic cell,			
4		a) a replication cassette comprising an origin of replication; and		
5	b) a replication system comprising			
6		i)	a polynucleotide encoding a polypeptide with RNA	
7	polymerase activity;			
8		ii)	a polynucleotide encoding a polypeptide with DNA	
9	polymerase activity;			
10		iii)	a polynucleotide encoding a polypeptide with DNA	
11	helicase activity and	• •		
12		iv)	a polynucleotide encoding a polypeptide with DNA	
13	primase activity;			
14	wherein the polynucleotide encoding each polypeptide is operably			
15	linked to a eukaryotic replication promoter, thereby initiating replication of the replication			
16	cassette independent from chromosomal DNA replication.			
1	2.	The method	of claim 1, wherein the replication system comprises a	
2				
3	polynucleotide encoding each of the following polypeptides: T7 RNA polymerase, T7 gene 4 protein, T7 DNA polymerase and TrxA.			
J	gene 4 protein, 17 D	1471 polymora	se and Trare.	
1	3.	The method	of claim 2, wherein the eukaryotic cell is a plant cell.	
1	4.	The method	of claim 2, wherein the eukaryotic cell is a mammalian	
2	cell.			
1	5.	The method	of claim 2, wherein the origin of replication is a T7	
2	bacteriophage origin of replication.			
1	6.	The method	of claim 2, wherein the replication cassette comprises	
2	a T7 promoter.			
	1			
1	7.	The method	of claim 2, wherein the replication cassette comprises	
2.	an expression cassette.			

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promoter is meiosis-specific.

- The method of claim 2, wherein the expression cassette comprises 1 8. a polynucleotide operably linked to an expression promoter in an antisense orientation. 2 9. The method of claim 2, wherein the expression cassette comprises 1 a polynucleotide operably linked to an expression promoter in a sense orientation. 2 The method of claim 2, wherein the replication cassette comprises 10. 1 at least 200 base pairs of DNA that is at least 70% identical to chromosomal DNA in the 2 3 eukaryotic cell. 11. The method of claim 10, wherein the replication cassette comprises 1 at least 200 base pairs of DNA that is identical to chromosomal DNA in the eukaryotic 2 3 cell. The method of claim 2, wherein the replication cassette comprises 1 12. 2 a recombination sequence. 1 13. The method of claim 12, wherein the recombination sequence is a 2 lox sequence. 14. The method of claim 2, wherein the replication system 1 polynucleotide(s) further encode a sequence-specific recombinase operably linked to a 2 3 promoter. The method of claim 14, wherein the sequence-specific 1 15. 2 recombinase is the Cre recombinase. 1 16. The method of claim 2, wherein the eukaryotic replication 2 promoter is tissue-specific. The method of claim 2, wherein the eukaryotic replication 1 17. 2 promoter is constitutive. The method of claim 2, wherein the eukaryotic replication 1 18.
- 1 19. The method of claim 2, wherein the eukaryotic replication 2 promoter is inducible.

1	20.	The method of claim 2, wherein at least one of the replication				
2	system polynucleotide(s) encoding T7 RNA polymerase, T7 gene 4 protein, T7 DNA					
3	polymerase and TrxA encode a nuclear localization signal.					
1	21.	The method of claim 20, wherein all of the replication system				
2	polynucleotide(s) en	coding T7 RNA polymerase, T7 gene 4 protein, T7 DNA polymerase				
3	and TrxA encode a	nuclear localization signal.				
1	22.	The method of claim 2, wherein the number of copies of the				
2	replication cassette is increased.					
1	23.	A eukaryotic organism comprising a polynucleotide encoding each				
2	of the following polypeptides: T7 RNA polymerase, T7 gene 4 protein, T7 DNA					
3	polymerase and TrxA, wherein the polynucleotide encoding each polypeptide is operably					
4	linked to a eukaryotic replication promoter.					
1	24.	The eukaryotic organism of claim 23, wherein the organism is a				
2	plant.					
1	25.	The plant of claim 24, further comprising a replication cassette				
2	comprising a bacter	iophage T7 origin of replication.				
1	26.	The plant of claim 24, wherein the replication cassette comprises				
2	an expression casse	tte.				
1	27.	The plant of claim 24, wherein the expression cassette comprises a				
2	polynucleotide oper	ably linked to an expression promoter in an antisense orientation.				
1	28.	The plant of claim 24, wherein the expression cassette comprises a				
2	polynucleotide oper	ably linked to an expression promoter in a sense orientation.				
1	29.	The plant of claim 24, wherein the replication cassette is episomal.				
1	30.	The plant of claim 29, wherein the replication cassette is a plasmid				
1	31.	The plant of claim 24, wherein the replication cassette is integrated				
2	into a eukaryotic chromosome.					

1	32.	The plant of claim 24, wherein the replication cassette comprises at		
2	least 200 base pairs	s of DNA that is at least 70% identical to chromosomal DNA in the		
3	plant cell.			
1	33.	The plant of claim 32, wherein the replication cassette comprises at		
2	least 200 base pairs of DNA that is substantially identical to chromosomal DNA in the			
3	plant cell.			

- 1 34. The plant of claim 24, wherein the replication cassette comprises a recombination sequence.
- 1 35. The plant of claim 34, wherein the recombination sequence is a *lox* 2 sequence.
- 1 36. The plant of claim 24, further comprising a polynucleotide 2 encoding a sequence-specific recombinase operably linked to a promoter.
- 1 37. The plant of claim 36, wherein the sequence-specific recombinase 2 is the Cre recombinase.
- 1 38. The plant of claim 24, wherein the eukaryotic replication promoter 2 is tissue-specific.
- 1 39. The plant of claim 24, wherein the eukaryotic replication promoter 2 is constitutive.
- 1 40. The plant of claim 24, wherein the eukaryotic replication promoter 2 is meiosis-specific.
- 1 41. The plant of claim 24, wherein the eukaryotic replication promoter 2 is inducible.
- 1 42. The plant of claim 24, wherein the polynucleotide(s) encoding T7
 2 RNA polymerase, T7 gene 4 protein, T7 DNA polymerase and TrxA each encode a
 3 nuclear localization signal.
- 1 43. A replication system comprising a polynucleotide encoding each of 2 the following polypeptides: T7 RNA polymerase, T7 gene 4 protein, T7 DNA polymerase

3	and TrxA, wherein the polynucleotide encoding each polypeptide is operably linked to a				
4	eukaryotic replication promoter.				
1	44. The replication system of claim 43, further comprising a				
2	polynucleotide encoding a sequence-specific recombinase.				
1	45. The replication system of claim 44, wherein the sequence-specific				
2	recombinase is the Cre recombinase.				
1	46. A polynucleotide, comprising				
2	a bacteriophage T7 origin of replication;				
3	a recombination sequence; and				
4	an expression cassette comprising a eukaryotic replication promoter.				
1	47. The polynucleotide of claim 46, wherein the recombination				
2	sequence is a lox sequence.				
1	48. The polynucleotide of claim 46, wherein the polynucleotide				
2	comprises a T7 promoter.				